

Large-scale Climatic Patterns and Precipitation in South Korea

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Abstract. El Niño and La Niña have been frequently reported to impact the interannual climate variability. The El Niño-Southern Oscillation (ENSO) is sometimes investigated to account for climatic abnormal phenomena around the world, and for hydrological forecasting models in water resources management. In this study, the linkages between large-scale climate patterns and regional precipitation variability, in particular the interannual variation of seasonal precipitation were investigated in South Korea. As a climate index of ENSO indicator, the Southern Oscillation Index (SOI) was selected to represent climate patterns. A conceptual influence index, which illustrates the linkage between climate patterns and precipitation variability, was developed based on the Standardized Precipitation Index (SPI) using monthly precipitation data of 23 stations. The relationships between ENSO and precipitation were investigated for different combinations of SOI and seasonal lag times from zero to three seasons, based on the exceedance probability conditioned on the ENSO episode which consists of warm episode, normal condition and cold episode. As a result of this analysis, the responses of precipitation to ENSO correlated well in South Korea except for 5 stations. Especially, 3 stations showed relatively strong and consistent relationships between ENSO and precipitation. Precipitation patterns for different seasonal lag conditions (Lag0 and Lag1) significantly responded to the El Niño-Southern Oscillation (ENSO) phases. In general, we observed an increasing precipitation in the warm ENSO phase and a decreasing precipitation in the cold ENSO phase. The overall results of this study revealed that the precipitation in South Korea was significantly influenced by climatic fluctuation phase.